



Forest Stand Improvement

Conservation Practice Job Sheet

Illinois Job Sheet - 666

APRIL 2003



DEFINITION

Forest stand improvement (sometimes called timber stand improvement, or TSI) is the manipulation of species composition, stand structure, and stocking by cutting or killing selected trees. In Illinois, where mixed hardwood species are the predominant forest cover, **crop tree management** is the best way to apply forest stand improvement. A crop tree is any tree that has been identified as desirable and worth retaining. Crop trees may have value for such purposes as wildlife habitat, aesthetics, water quality, timber or a combination of 2 or more purposes. Crop tree management is the selective removal of less desirable trees that compete with crop trees. Removing adjacent competing trees assures the survival and increased growth of crop trees. Focusing management attention on only the highest value trees reduces the time and cost of performing forest stand improvement, compared to area-wide thinning. Often far fewer trees need to be cut or killed by applying crop tree management compared to other methods.

APPLICATION

Depending upon producer objectives the following **criteria** may be **used to select crop trees**:

Wildlife Habitat

Mast-producing¹ species:

- full sun on crown
- large healthy crown
- favor hard mast producers
- expected longevity² >20yrs.

Cavity trees:

expected longevity > 10yrs.

Timber

- full sun on crown
- large healthy crown
- no forks or large branches low on main stem
- high value commercial species
- expected longevity² > 20 years

Water Quality

- full sun on crown
- healthy crown and root system
- tolerant of flooding³/suited to the site³
- high growth/nutrient accumulation potential
- expected longevity² > 20 years

Aesthetics

- attractive flowers and/or foliage color
- expected longevity² > 20 years
- unusual species and/or tree form
- visible from house, road or trail

¹Mast is the fruit of trees, which may be hard (acorns, walnut, hickory nuts) or soft (black cherry, maple, hackberry, mulberry).

²Expected longevity is estimated by looking at the size and condition of the tree, especially any evidence of injury or decay.

³See Conservation Tree/Shrub Suitability Groups, Section II, FOTG and/or Chapter 3, IL Direct Seeding Handbook.

CROP TREE INVENTORY

Crop trees may be selected and released when a height of 25 feet or diameter at breast height (DBH) of 4 inches is reached, which is usually at age 10 to 15 years. Use the Crop Tree Inventory Tally Sheet to inventory and analyze potential crop trees. Locate at least one plot in each identifiable stand of trees. A 1/5-acre plot is recommended, with a radius of 53 feet. Flag the plot boundaries at the four cardinal directions. Using different colored flagging, flag crop trees and trees to be cut ("cut trees") to help the producer visualize the treatment. A short transect, consisting of 3 or more plots, through a representative portion of a forest stand will yield enough data to plan future treatments. There should be at least 150 feet between plot centers. The average number of crop trees per acre and cut trees per acre, and the characteristics of these trees, will help the producer or forestry contractor plan future treatments. In most cases 50-75 crop trees will be released per acre (10-15 crop trees per 1/5-acre plot and approximately 25 feet or more between crop trees). Landowner objectives and stand quality may result in as few as 5-20 crop trees per acre (1-5 per plot).

CROP TREE MANAGEMENT

Unwanted trees, shrubs and vines may be killed by any of the following means; cutting, girdling, frilling, stem injection, or basal bark spray. Foliar sprays can be used for shrubs and small trees. For specific information about techniques for killing trees, including recommend herbicides, see Controlling Undesirable Trees, Shrubs, and Vines in Your Woodland and Herbicides for Forest Management 2002 in References.

Determine whether trees to be cut constitute a marketable volume of timber. Landowners planning to sell timber should obtain the services of a

professional forester, know the amount of timber to be sold through an inventory, receive sealed bids, obtain a signed contract with an Illinois licensed timber buyer, receive full payment before cutting begins, and supervise harvest operations. For further information and sample contracts see Here's How to...Write an Iron-Clad Timber Sale Contract in References. Best results are often obtained by retaining the services of a professional forester to conduct forestry practices, particularly the sale of timber. Consider environmental concerns such as threatened and endangered species and natural areas.

OPERATION AND MAINTENANCE

Crop tree release cutting may be repeated at 5 to 15 year intervals depending on site type and site quality. See Recommended Silviculture and Management Practices for Illinois Hardwood Forest Types in References.

REFERENCES

Controlling Undesirable Trees, Shrubs and Vines in your Woodland. Ohio St. Univ. Exten. Pub. F-45.
<http://ohioline.osu.edu/for-fact/0045.html>

Crop Tree Management: A Tool to Help You Achieve Your Woodland Goals. Ohio St. Univ. Exten. Pub. F-50-02, 2002. <http://ohioline.osu.edu/for-fact/0050.html>

Crop Tree Management in Eastern Hardwoods. Perkey, A.W., B.L. Wilkins, and H.C. Smith, USDA-Forest Service, NE Area S&PF, Pub. NA-TP-19-93, 1994.
http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_in dex.html

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<http://www.safnet.org/archive/contract701.htm>

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Herbicides for Forest Management 2002, WI DNR Pub. No. 76, Mar. 2002,
<http://forest.wisc.edu/extension/publications/76.pdf>